Installing Audiovox CS-100 Cruise Control on a CS coupe

After driving my newly acquired ’72 BMW 3.0CS some 2700 miles from Seattle to its new home in Austin, I decided a cruise control was definitely in order for any future long distance trips. After doing a bit of research, I settled on the Audiovox unit. It has been on the market for a number of years, and has garnered a number of favorable reviewers by users. Mine came from Amazon, about $90.

Installation is fairly straight-forward. The primary considerations are:

1) Where to mount the vacuum control unit
2) How to connect the control cable to the accelerator linkage
3) Where to mount the cockpit control switch

One primary consideration was that I wanted to preserve the OEM appearance under the hood as much as possible. I found that there was ample space in the driver-side headlight bay (underhood headlight cover) to install both the vacuum unit and the aux. vacuum tank (more about this later).

CRUISE CONTROL UNIT INSTALLATION

I installed the vacuum control unit in the headlight bay with the little cover with dipswitches facing upward, so I could access them easily for changes. I mounted the unit by securing an M6 bolt with nut and lockwasher through the bulkhead in front of the battery, then using a wing nut to actually mount the control unit, again for easy removal if needed.

Jumper settings on the unit should be:

SW 1, 2 OFF (RPM 2,000)
SW 3 ON (magnets for speed signal)
SW4, SW5 OFF (speed sensitivity Medium)
SW 6 OFF (using supplied dash control head)
SW 7 ON (Tach source, coil, but not really used in this installation)

Note that if yours is a manual transmission, you must remove the black jumper in the control box. Also, I found that the directions in the manual for manual transmission on our Bimmers did NOT apply:

> ~~***NOTE:*** *If the vehicle is a manual transmission and does not have a VSS wire, the cruise will operate from tach signal only. Program dip switch #1 and #2 for 4000 PPM and move dip switch #3 to OFF position*~~

I tried this option, couldn't get it to work, and was informed by the Audiovox tech folks that I would need to install the magnet kit on the driveshaft (included).

Accordingly, in the picture above, the blue wire coming out of the hole near the headlight cover is the tach signal wire. I will be removing this, as it is not necessary nor functional with an installation using the magnets for speed sensing.

Supposedly, for clutch operated cars, the tach signal will sense a quick RPM increase when the clutch is depressed, and disengage the cruise. I never could get this to work.. neither could the Audiovox techs, and, besides, I wasn't really thrilled about having the engine rev up (*slightly,* according to the manual) every time I depressed the clutch. Instead, I installed a clutch pedal switch.. more about this later.

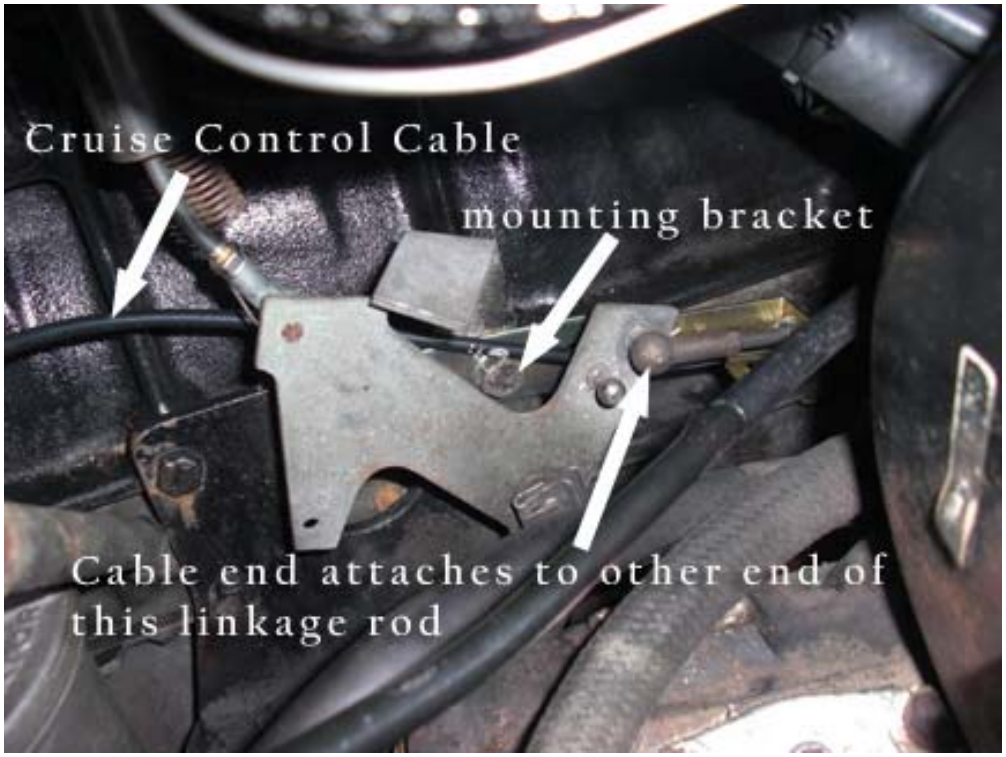
I wrapped the electrical harness provided in the kit with harness tape, instead of using the boy-racer-style split plastic covering that came with the kit.

Then I ran both the vacuum line (attaches to the cruise control unit) and the electrical harness through the existing wire bundle grommet forward of the battery, and routed the vacuum line along the fender to tee into the existing distributor vacuum advance line from the carbs.

To route the throttle cable from the unit, I just ran the control cable through an existing hole near the battery box (removing the battery temporarily helps in this job). Be sure to use a rubber grommet in the hole!

Next, I installed the cruise control cable to the throttle linkage. There are a variety of connectors provided in the kit. I found the most out-of-sight solution was to mount one of the provided brackets to the primary throttle bellcrank mechanism, just under the carbs, and then attach the actuating chain back to the accelerator pedal arm, by placing one of the supplied connectors underneath the ball&socket linkage rod.

This setup worked smoothly, required no drilling or modification, and provided a virtually unseen under hood installation.



MAGNET INSTALLATION

Since our cars do NOT have a “VSS” (vehicle speed sensor), we have to rely on the old tried-and-true method of installing a tiny magnet on the driveshaft, with a sensor mounted nearby to pick up road speed signals. A car lift really comes in handy here, but this is a pretty simple process. The magnets are very tiny, and presumably don’t impose any balancing issues on the driveshaft. I found the provided mounting bracket worked very well, and I just drilled a small hole in the side of the tranny tunnel to mount the bracket with a through-bolt.

COCKPIT CONTROL HEAD INSTALLATION

The installation manual wants you to cut a 1.5” slot in your dash to run the control wires through. I wasn’t about to go sawing holes in my precious vintage Bimmer. As it turned out, on my car, someone had added a long-unused switch just left of the headlight switch, leaving a small hole left in the dash. I fabricated a small offset mount from Lexan plastic so that the wires coming out of the back of the control unit would have some room, and then just ran the wires underneath, and through the hood release “hatch”. For owners with no holes in the dash, I would suggest fabricating a couple of spacers for the control head, and then just using double-sided tape to attach the unit to the dash or the side of the steering wheel.

The final step in the process is connecting the cruise control wiring harness to the brake switch, located just above the brake pedal itself. Instructions are clear, and this is a simple process. I did NOT use the press-on connectors; I always have unpredictable results with these. Instead, I soldered the new wires to the existing brake switch wires. This is best done by removing the under-dash panel on the driver's side.

TEST DRIVE

On my first test drive with the new unit, I was pleased to find that the cruise control engaged as promised. However, there were 2 problems: Anytime I went up the slight hill, the control was unable to depress the throttle enough, and speed dropped. And, if I depressed the clutch, the unit wouldn't disengage as advertised, so the engine revved up.

After several discussions with Audiovox technicians (following a long wait on the phone), it was determined that I needed both the Audiovox-offered "vacuum reservoir" to solve the speed hold problem, and a clutch switch. On some cars, there is not enough vacuum available to power the unit when going up hills. I suspect this issue may be specific to my installation of triple Weber DCOE 40 carbs. The Korman manifold for these units is designed for direct-to-intake-port passage of each individual Weber throat, with no cross-over between cylinders. Bottom line is that this setup only provides one cylinder's worth of vacuum, not enough to power the unit. A vacuum tank is needed, similar to that used by the power brakes, but smaller.

Additionally, I was instructed to purchase the Audiovox clutch switch to insure positive disengagement of the cruise control when the clutch is depressed.. I decided I was unwilling to shell out almost the cost of the original unit for these two items. Instead, I found a new CS brake switch on eBay for $9.95, and then decided to fabricate my own vacuum tank.

BUILDING A VACUUM STORAGE TANK

Most coupes with stock carbs or injection probably will not need a separate vacuum storage tank. But those with individual Weber carbs and direct manifolds will. A tank can be fabricated for less than $10 in parts. You will need:

1) a 2" diameter piece of PVC pipe, about 10 inches long
2) a 2" PVC cap for each end
3) 2 ¼" threaded hose barbs (available at any hardware store)
4) a one-way inline vacuum valve… just a couple of bucks at any autoparts store

A. Drill and tap 2 holes in the side of the PVC pipe (or in the end caps) to install the 2 threaded hose barbs. If you don't have a tap, you can just use JB weld to secure the hose barbs to the "tank".

B. After cleaning out any drilling debris, glue the end caps on the PVC pipe.

C. Attach a hose from one barb and run it to the vacuum connection on the cruise control unit.

D. Place the inline one-way vacuum valve between the remaining hose barb and the vacuum source on your engine. With the one-way valve installed on the storage tank, you should be able to suck on it, but not blow.

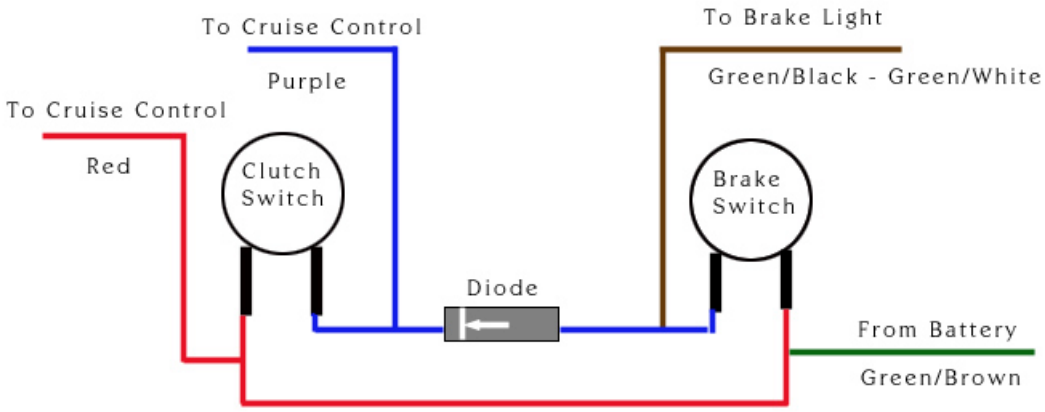
E. Finally, I installed the tank alongside the vacuum control unit in the headlight well. I used a couple of plastic tie-wraps to secure the tank.

INSTALLING THE CLUTCH SWITCH

For manual transmission cars, installing a clutch switch seems to be the only positive way to insure cruise disengagement when depressing the clutch. I purchased a BMW coupe brake switch on ebay for less than $10. The pedal installation design of the coupe makes installation of this switch simple. There is already a hole in the pedal support bracket to install a mounting bracket for the switch. I used a left-over, multi-holed bracket from the Audiovox kit, heated and bent it as necessary to position the switch over the clutch pedal, similar to the stock brake switch installation.

You will need to use a simple Diode (available from Radio Shack for a couple of bucks) in line with the clutch switch wiring, otherwise, when you press on the clutch the brake lights will illuminate.

Wiring for this setup is as follows. Make sure the diode is installed in the direction shown in the diagram:



That should do it! Happy Cruising.

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